A.D. 1870, 24th June. N° 1800.

SPECIFICATION

OF

JAMES SINCLAIR.

RESPIRATORY APPARATUS.

LONDON:
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1870.

A.D. 1870, 24*th* JUNE. N° 1800.

Respiratory Apparatus.

LETTERS PATENT to James Sinclair, of the City of Manchester, Merchant, for the Invention of "IMPROVEMENTS IN RESPIRATORY APPARATUS."

Sealed the 14th October 1870, and dated the 24th June 1870.

PROVISIONAL SPECIFICATION left by the said James Sinclair at the Office of the Commissioners of Patents, with his Petition, on the 24th June 1870.

I, JAMES SINCLAIR, of the City of Manchester, Merchant, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN RESPIRATORY APPARATUS," to be as follows :—

These improvements relate to that description of respiratory apparatus in which a reservoir of atmospheric air having tubes communicating with a mouth piece is used to enable a person to enter localities or places in which it would otherwise be impossible to breathe, and which is performed by breathing the contents of such reservoir, one tube supplying the necessary air for inspiration from the upper part of such reservoir and

another tube conveying the expired air into the lower part of the same reservoir.

Now this Invention consists in the use and application of a face piece, which is constructed by preference of thin sheet metal, and is surrounded by a hollow pad of india-rubber filled with water or other liquid; this face piece is of a suitable shape to cover the nose and mouth, and to lie close against the face, so as to form an air-tight joint all round, and is held in position by means of straps or bands passing round the back of the head. To this face piece two lengths of india-rubber tubing fitted with inlet and outlet valves are affixed, so as to enable the operator to breathe the pure air from a distance although the immediate neighbourhood in which he is working may be injurious to health or calculated to endanger life. This face piece is also used in substitution for the mouth piece hitherto employed, and communicates with the air reservoir through a three-way cock and the usual inlet and outlet tubes which are in this case provided with inlet and outlet valves of any suitable construction.

The method of using this improved apparatus is as follows:—The padded face piece herein-before described being fixed upon the face of the operator, and the three-way cock being set open to the atmosphere, so as to allow the operator to breath the surrounding air, he may proceed into the vicinity of the vitiated or noxious gases, and immediately upon feeling a difficulty in breathing may turn the three-way cock, and thus open up a communication with the interior of the air reservoir and thence forward breathe its contents, the inlet and outlet valves opening and closing as he inhales and expires.

By disconnecting the joint of the tube leading to the bottom of the reservoir he may expire into the surrounding air and inhale from the reservoir, the inlet tube being provided with an extra valve opening outwards for this purpose.

If the apparatus is required for proceeding into the immediate neighbourhood of a fire or other locality where the presence of smoke or other gases would be liable to affect the eyesight, the face piece for covering the nose and mouth is extended upwards so as to cover the eyes as well, and transparent glasses are introduced in proper positions and at suitable angles in such face piece to allow the operator to see clearly.

Sinclair's Improvements in Respiratory Apparatus.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said James Sinclair in the Great Seal Patent Office on the 24th December 1870.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES SINCLAIR, of the City of Manchester, Merchant, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-fourth day of June, in the year of our Lord One thousand eight hundred and seventy, in the thirty-third year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Sinclair, Her special license that I, the said James Sinclair, my executors, administrators, and assigns, or such others as I, the said James Sinclair, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN RESPIRATORY APPARATUS," upon the condition (amongst others) that I, the said James Sinclair, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said James Sinclair, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

These improvements relate to that description of respiratory apparatus in which a reservoir of atmospheric air having tubes communicating with a mouth piece is used to enable a person to enter localities or places in which it would otherwise be impossible to breathe, and which is performed by breathing the contents of such reservoir, one

tube supplying the necessary air for inspiration from the upper part of such reservoir, and another tube conveying the expired air into the lower part of the same reservoir.

Now this Invention consists in the use and application of a face piece which is constructed by preference of thin sheet metal and surrounded by a hollow pad of india-rubber filled with water or other liquid, this face piece is of a suitable shape to cover the nose and mouth, and to lie close against the face so as to form an air-tight joint all round, and is held in position by means of straps or bands passing round the back of the head. To this face piece two lengths of india-rubber tubing fitted with inlet and outlet valves are affixed so as to enable the operator to breathe the pure air from a distance although the immediate neighbourhood in which he is working may be injurious to health or calculated to endanger life. This face piece is also used in substitution for the mouth piece hitherto employed and communicates with the air reservoir through a three-way cock and the usual inlet and outlet tubes which are in this case provided with inlet and outlet valves of any suitable construction. The method of using this improved apparatus is as follows:—

The padded face piece herein-before described being fixed upon the face of the operator, and the three-way cock being set open to the atmosphere so as to allow the operator to breathe the surrounding air, he may proceed into the vicinity of the vitiated or noxious gases, and immediately upon feeling a difficulty in breathing may turn the three-way cock and thus open up a communication with the interior of the air reservoir and thence forward breathe its contents. By disconnecting the joint of the tube leading to the bottom of the reservoir he may expire into the surrounding air and inhale from the reservoir, the discending tube being provided with an extra valve which closes for this purpose.

If the apparatus is required for proceeding into the immediate neighbourhood of a fire or other locality where the presence of smoke or other gases would be liable to effect the eyesight the face piece for covering the nose and mouth is extended upwards so as to cover the eyes as well, and transparent glasses are introduced in proper positions and at suitable angles in such face piece to allow the operator to see clearly.

Sinclair's Improvements in Respiratory Apparatus.

In order that the nature of this my said Invention may be the more readily seen and understood, I have hereunto annexed a Sheet of Drawings illustrative of several modifications of my improvements in respiratory apparatus. Similar letters being used to denote similar parts in all the views.

Fig. 1 is a front view, and Fig. 2 a side view of the face piece used in my improved respiratory apparatus drawn to a scale of about half size; Fig. 3 is a sectional plan of Fig. 1 through the line *a* to *b*. This face piece consists of a thin sheet metal casing A surrounded on its front edge by a tubular pad of india-rubber B filled with water or other suitable liquid, and held on to the face of the wearer by means of the strap C and broad elastic band D. To the lower part of this face piece a tube E is connected which communicates at its lower extremity with the three-way cock F shewn in section in Fig. 1. This three-way cock is provided with a hollow plug which is open to the tube E at the bottom, and has a transverse passage direct through it corresponding with the passages formed through the tail ends F^1 and G, and with an opening H formed through the body of such cock seen in Figs. 2 and shewn dotted in Fig. 1. In the tail ends of this cock (see Fig. 1) india-rubber flap valves are mounted, the outlet valve marked J, and the inlet valve (which is shown partly open) marked K. To these tail ends the india-rubber tubes are attached for conveying the air to and from the face piece.

Fig. 4 is a front view; and Fig. 5 a side view (drawn to a scale of about quarter size) of a complete respiratory apparatus constructed according to this Invention. The face piece herein-before described is shewn in these views connected by the flexible inlet tube L and flexible outlet tube M to the reservoir or air supply bag N, which may be made of india-rubber or any other suitable material and be of any convenient shape, the rectangular form illustrated on the Drawings and seen in plan in Fig. 6, being found most useful for carrying on the back without experiencing any difficulty in entering doorways or narrow passages. It is supported in position on the back of the wearer by the shoulder straps O, O, and can be inflated with atmospheric air or other gas, by means of a pair of ordinary bellows, the nozzle of which may be inserted through the connection P which unscrews for the purpose. The inlet tube L is continued down to the bottom of the bag, as seen dotted in Figs. 4 and 5, and to prevent the descending part of this inlet tube being bent and injured whilst the apparatus is being carried from place

to place, the wooden rods Q, Q, are affixed at the back of the bag as illustrated in order to stiffen it and also to prevent it being folded transversely when not inflated.

Fig. 7 represents a fireman equipped with my improved respiratory apparatus, and in the act of carrying a quantity of valuables, shewing that free use of the arms and all parts of the body is retained whilst wearing the apparatus.

I will now proceed to describe more precisely the action and manner of using my improved respiratory apparatus. To fill the air reservoir N it is only necessary to turn the plug of the three-way cock F so as to close the communication with the face piece, and then by means of a pair of ordinary bellows, the requisite quantity of atmospheric air may be introduced as herein-before described. The three-way cock is now in the right position to allow the operator to breathe the outer air through the opening G, formed in the body of the three-way cock F and the face piece may now be fixed on the face of the wearer, the thin sheet metal casing being easily bent to suit the shape of any face, so that the hollow pad will cover the nose and mouth and form an air-tight joint all round by being held securely in position by the straps C and elastic band D passing around the back of the head as seen in Fig. 7. The operator may now proceed into the vicinity of the vitiated or noxious gas or smoky atmosphere, and immediately upon feeling a difficulty in breathing may turn the plug of the three-way cock F a quarter turn, and thus open a communication with the interior of the bag or air reservoir N and begin to breathe its contents. The necessary air for inspiration is now drawn by the simple act of inhaling from the top of the bag through the outlet tube M and valve J, whilst the vitiated or expired air escapes through the valve K and inlet tube L into the lower part of such bag or air reservoir. If it is requisite to remain for a long time in the presence of vitiated air, and the contents of such bag are becoming impure, the expired air may be allowed to escape into the atmosphere direct without returning into the bag by disconnecting the socket joint of the inlet tube as seen dotted in Fig. 4, such inlet tube in that case being provided with an extra india-rubber flap or other description of valve to prevent the escape of the contents of the bag.

In localities where the presence of smoke or other gases would be injurious to the eyesight, I employ another modification of face piece

which is extended upwards so as to cover the eyes as well as the nose and mouth; and transparent glasses are introduced in proper positions and at suitable angles in such face piece to allow the wearer to see clearly. This face piece is seen in Figs. 7 and 8, illustrating respectively a front and side view. In these views R, R, represent the transparent glasses or goggles, situated in the upper part of the face piece opposite to the eyes of the wearer, and this face piece is surrounded by a similar description of india-rubber pad S, filled with water or other suitable liquid to that which is described in reference to the face piece, illustrated by Figs. 1, 2, and 3. These face pieces are also useful for breathing pure air from a distance in trades or occupation where the atmosphere immediately surrounding is charged with dust, injurious vapours or gases, such pure air being conveyed through inlet and outlet tubes attached to such face piece, or compressed air may be employed, in which case I prefer to use an intermediate receptacle into which the compressed air is first fed. A suitable apparatus for this purpose is illustrated by Figs. 9 and 10, representing a front and side view, in which T is the receptacle or intermediate cistern, which is fastened round the wearer's waist by the straps U at the back, and is supplied with atmospheric air, either compressed or at atmospheric pressure, through the supply tube V, and regulated in quantity by the cock W. This receptacle is in communication with the face piece X, through the india-rubber tube Y (seen in section in Fig. 9), which has a number of slits cut tranversely through its whole length, as illustrated, in order to render it extremely flexible, and is surrounded by an outer tube of air-proof cloth Z, which hangs loosely about it, as illustrated, for the sake of flexibility, and so as not to interfere with the movements of the body and head of the wearer.

a is a valve box formed in two parts, one marked *b* sliding within the other (marked *c*), so as to open a communication with the outer air through the holes *d* formed around the outer casing, when the internal casing is drawn out as seen in Fig. 10, and on an enlarged scale in Fig. 11. The internal casing *b* is provided with a disc valve *e*, seen in section on an enlarged scale in Fig. 11, which opens when the wearer exhales, and immediately closes again by the action of the spiral springs *f* surrounding its spindle when he inhales.

The action of this apparatus is as follows:—The receptacle T forms a cistern which is always filled with air supplied as herein-before

described and from which the operator may inhale without the inconvenience of having to draw the air through a long length of tubing, whilst when he exhales the disc valve *e* opens and allows the vitiated air to escape into the outer air through the perforations *g*, formed through the end of the internal casing. If the wearer requires to breathe the outer air whilst wearing the apparatus, all that is necessary is to draw out the internal casing *b* to the position shewn in Figs. 10 & 11, when he will inhale and exhale through the holes *c* surrounding the outer casing.

Having thus particularly described and ascertained the nature of this my said Invention, together with the best methods with which I am acquainted for carrying the same into practical effect, I wish it to be understood that I claim,—

1st. The peculiar construction and arrangements of the face pieces and goggles to be used in conjunction with respiratory apparatus, as and for the purpose herein-before described and illustrated on the accompanying Drawings.

2nd. The use and application of a three-way cock fitted with inlet and outlet valves as and for the purpose described and illustrated on the accompanying Drawings.

3rd. The peculiar arrangement and construction of intermediate reservoir and valve box, described in reference to Figs. 9 & 10, for breathing compressed air or air conveyed from a distance, as and for the purpose described.

In witness whereof, I, the said James Sinclair, have hereunto set my hand and seal, this Twenty-third day of December, in the year of our Lord One thousand eight hundred and seventy.

JAMES (L.S.) SINCLAIR.

Witness,

JOHN G. WILSON,
Patent Agent,
71, Market Street,
Manchester.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1870.

A.D. 1870, June 24, N°1800,
SINCLAIR'S Specification.

(1 SHEET)

FIG. 1.

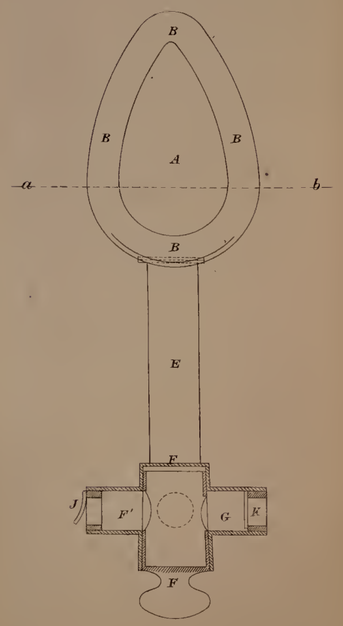


FIG. 2.

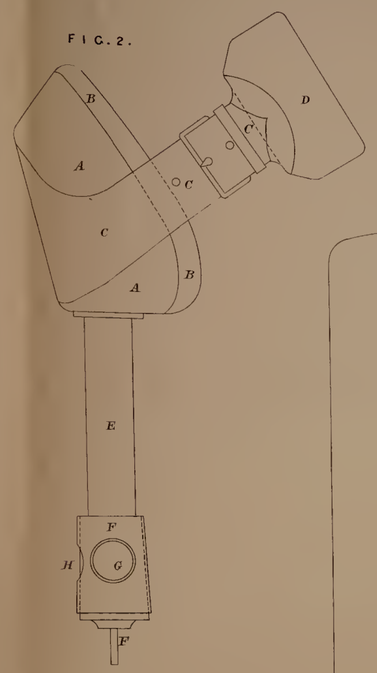


FIG. 4.

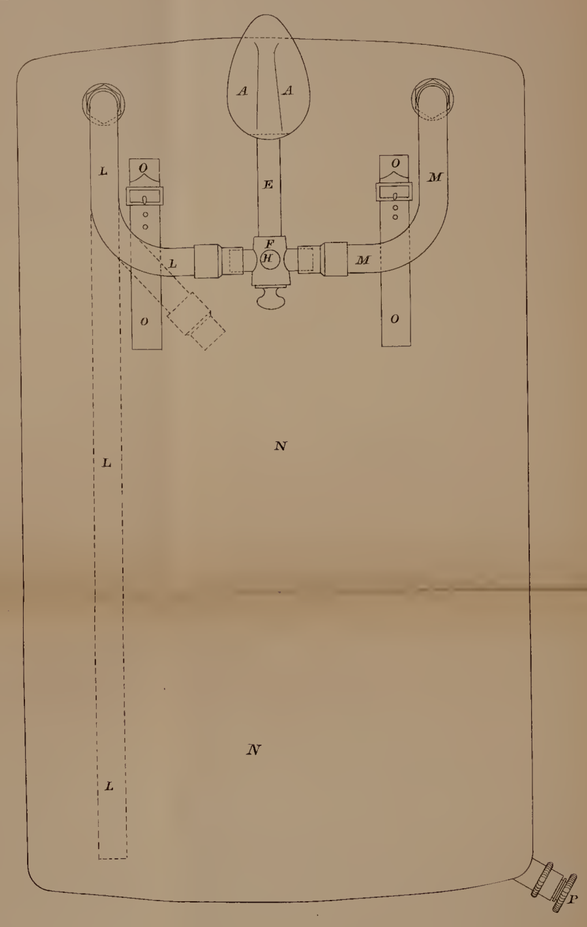


FIG. 5.

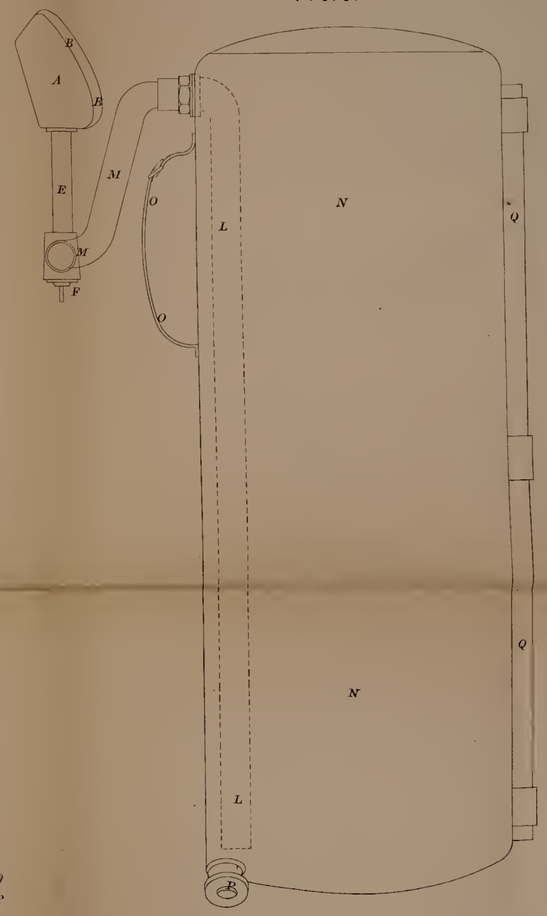


FIG. 7.

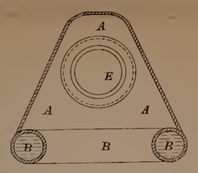


FIG. 3.

FIG. 7.

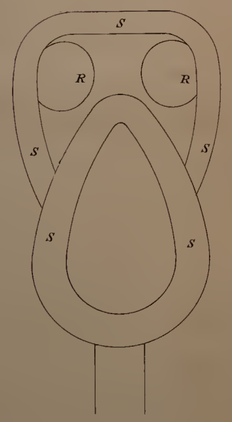
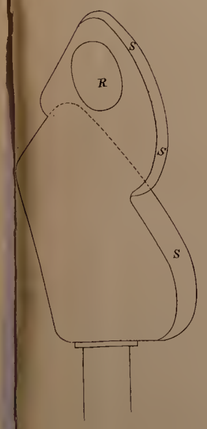


FIG. 8.



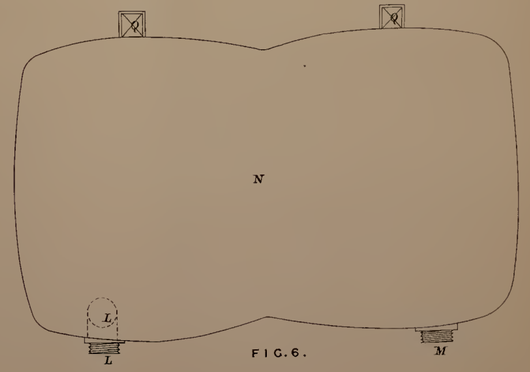


FIG. 6.

FIG. 9.

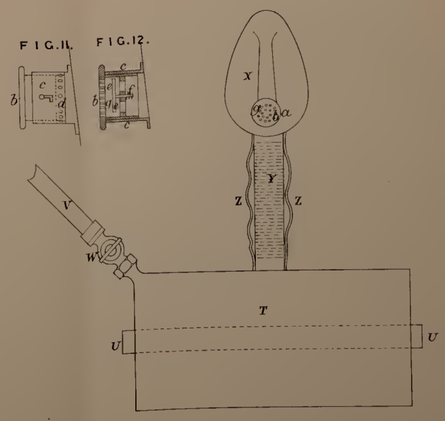
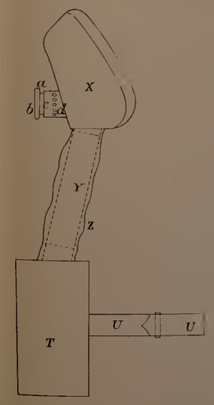


FIG. 11.

FIG. 12.

FIG. 10.



The filed drawing is not colored.

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